

39. *Mermithid-worm Parasitic in Leaf-hoppers, with Notes on its Life History and Habits.*

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This is a brief account of a new Mermithid-worm parasitic in leaf-hoppers, such as *Nilaparvata oryzae* and *Sogota furcifera*, which produce at times a great deal of injury to the rice plant. At a glance this species appears to be closely allied to *Hexamermis* (*Mermis*) *albicans* Hagmeier and *Agamermis decaudata* Cobb, Steiner and Christie, but it can be distinguished from the former by the self-amputation of the tail on the occasion of infestation and from the latter chiefly by the different form and position of the paired amphids, the possession of the cervical papillae and the position of the vulva lying posterior to the middle of the body. To us it seems to represent a new species, which we call

Agamermis unka n. sp.

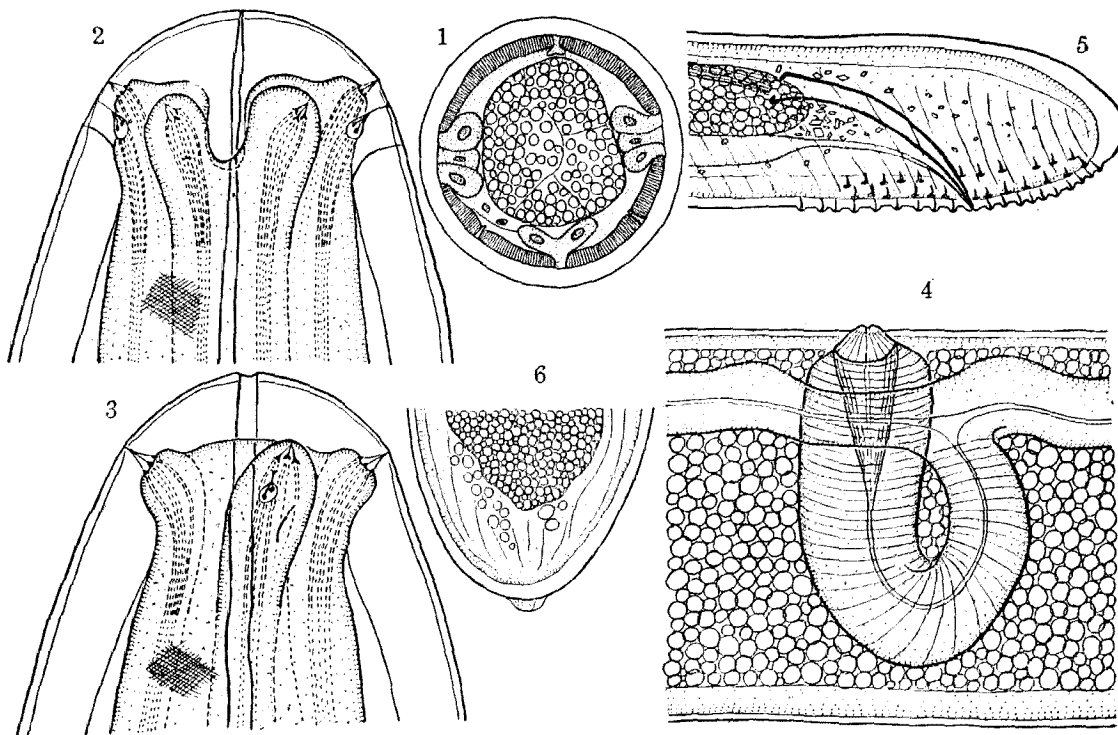
Measurements by Cobb's formula:

	Head papillae	Nerve ring	Vulva	End of fat body	
♀	0.051	1.09	55.22	99.62	28.32 (24.43-34.95) mm. n-10.
	0.047	0.15	0.28(0.22-0.34)	0.18	
				Male genital opening	
♂	0.071	1.43	-M-	99.09	19.45 (11.02-22.82) mm. n-10.
	0.047	0.13	0.22(0.19-0.29)	0.16	

Body slender, cylindrical, tapering extremely forwards and slightly backwards. Cuticle thick, especially at the body ends, marked with coarse criss-cross fibers. Six longitudinal lines running throughout the body (Text-fig. 1). Anterior end rounded, with six head papillae, exhibiting a cuticular incision between the papillae on the left and right sides (Text-fig. 2). Mouth terminal; pharynx absent; oesophageal tube chitinized, narrow and extremely long. Amphids paired, represented by a pear-shaped pouch with some two terminals slightly behind the

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lateral papilla (Text-figs. 2 & 3). Cervical papillae paired, occupying a position slightly posterior to the amphids. Nerve ring well developed, about 0.29 (0.25–0.40) mm. apart from the anterior end. Excretory pore absent. Fat body extending from a little behind the nerve ring to near the tail end. Ovaries double; one outstretched forwards, the



Text-fig. 1. Cross-section through near the anterior body end of the larva left the leaf-hopper.

Text-fig. 2. Head region of the female, dorsal view.

Text-fig. 3. Same, lateral view.

Text-fig. 4. Vulvar region of the female.

Text-fig. 5. Tail portion of the male.

Text-fig. 6. Tail end of the larva left the host.

other backwards. Vulva lying a little posterior to the middle of the body and slightly projecting outwards. Female genital opening found as a rectangular crack in the cuticle. Vagina of a strongly muscular nature, U-shaped rather than S-shaped (Text-fig. 4). Testes double; one outstretched forwards, the other backwards. Spicula two, yellowish, rather short, slightly curved, measuring 0.19–0.23 mm. in length. Male copulatory papillae 74–111 in number, arranged in three longitudinal series on each side of the genital opening, not extending to the front of the spicula (Text-fig. 5). Tail conical, rounded at the end in both sexes. Larva shedding the tail when intruding into the host.

Life history and habits.

The nema just mentioned has up to the present been discovered from the vicinities of Ōita, Fukuoka, Nagasaki, Miyazaki and Mito. Occasionally it is found to infest the leaf-hoppers at a high percentage. Esaki and Hashimoto, examining vast numbers of leaf-hoppers collected in the neighbourhood of Ōita, find that the parasitism attains to 70.58% (2,961 out of 4,195) in *S. furcifera* and 41.3% (65 out of 158) in *N. oryzae*. The infested nema, according to examination conducted by the Ōita Agricultural Experiment Station, leaves the host from the middle of August to the end of November, especially in early autumn, and makes its way into the soil. The nema free from the host, after casting off once in the soil, attains to maturity during the winter and frequents at a depth of about 10 cm., coiling itself in the nest. Mating happens at about the middle of May, and egg-laying takes place from the end of June to early autumn, especially in the beginning of August. Around the worm body in the nest are found vast numbers of eggs which measure 75μ by 70μ . Under the climatic conditions of July the larva hatches out about three weeks later. The newly hatched larva is about 0.6 mm. long by 0.012 mm. wide and is of a close resemblance in structure and habits to that of *Amphimermis zuimushi* described by the authors. According to its special tropic properties the larva appears on the surface of the field, swims in the irrigation water to the rice plant, and finally gets chance to intrude into the host which rests on the plant near the water. The infestation happens in all probability at dewy night. Generally one or two, rarely more than two, nemas are found to infest the host. Not only does the mermithized leaf-hopper render the abdomen highly swollen with the growth of the parasite, but it becomes decidedly inactive. In addition the body wall in the case of *N. oryzae* is of a deep brown colour. After passing its parasitic life for 2-3 weeks, the nema leaves the host through the thin body wall between the abdominal segments at the nymphal more than at the adult stage, oftentimes resulting in sloughing off the ventral body wall. Beyond doubt it plays an important rôle in the control of some leaf-hoppers.

Here it might be noticed that the present nema is able to breed in the soil under optimum temperatures and moisture contents by preventing the parasitism of fungus, bacteria, sporozoa, and others.
